

**Federal Republic  
of Germany**

**Patent Application** (unexamined)  
**DE 196 01 503 A1**

**Int. Cl.<sup>6</sup>:  
G 11 B 17/22**

File Number: 196 01 503.0  
Application Date: 17 January 96  
Laid Open: 22 May 97

**German Patent  
Office**

Domestic Priority:  
15 November 95 DE 195424840

Applicant:  
NSM AG, 55411 Bingen, DE

Representative:  
Becker, B., Dipl.-Ing., Patent Attorney,  
55411 Bingen

Inventors:  
Menke, Wilhelm, 55411 Bingen, DE;  
Heidersberger, Borge, 55411 Bingen, DE;  
Stühler, Rolf, 65205 Wiesbaden, DE

Drawer for loading and unloading a disk changer with a disk

A drawer (1) for loading and unloading a disk changer with a disk (50), in particular for compact disks, comprises a bottom part (3) fastened in the housing (2) of the disk changer, a receiving tray (5) on the bottom part (3) which can be moved in and out and an exchangeable disk holder (12) held in the receiving tray (5) for receiving the disk (50). To prevent displacement of the disk holder (12) during the sliding-out of the drawer (1) at the start of the opening process, a latching and an unlatching device (15) is provided on the receiving tray (5) substantially vertically swivellable and actuatable from the bottom part (3), which device is provided with snap elements (21, 19) for engaging the bottom part (3) when the receiving tray (5) has been slid in and for engaging the disk holder (12) when the receiving tray (5) has been slid out.

## Specification

The invention relates to a drawer for loading and unloading a disk changer with a disk, in particular for compact disks, comprising a bottom part fastened in the housing of the disk changer, a receiving tray which can be moved in and out on the bottom part and an exchangeable disk holder mounted in the receiving tray for receiving the disk.

Disk changers of this type are known in various models. DE 39 22 721 discloses for example a disk playback device, in which two disk magazines, each comprising a multiplicity of superjacently disposed receiving trays for the storage of a corresponding number of disk holders each receiving one disk each, and being disposed opposingly laterally in a housing. In the space between the disk magazines is located a transport device which can be raised and lowered for the transport to and from of a desired disk with the associated disk holder between the receiving tray and a playback unit.

Disk changers or disk playback devices are frequently provided with a loading drawer. WO-A 95/07531 discloses a playback and recording device for disks with a disk magazine receiving disk holders with disks in superjacent receiving trays, at least two drives for reading or writing data from or onto the disk and a transport device movable in the stack direction of the disk magazine for the alternate transport of the individual disks with the disk holder between any desired receiving trays and the drives. In the tower of the drives a loading drawer receiving a disk holder with a disk is integrated. This loading drawer receives a disk holder equipped with a disk, which, in the moved-in state of the loading drawer can be grasps by the transport device. In the moved-out state of the loading drawer a disk can readily be exchanged by hand.

A disk playback device with such a drawer which can be moved in and out, is

also known from EP 0 439 483 B1. Often such devices are structured such that, on the one hand, in the drawn-out state of the drawer the disk can readily be exchanged, but, on the other hand, an undesirable shifting of the disk holder is possible. A shift of the disk holder, however, should only be possible when the drawer is slid in in order to ensure the exchange of the disk holder receiving the disk in the disk changer, for example from one receiving tray into another receiving tray of a disk magazine or from one disk magazine to another disk magazine.

It is therefore the task of the invention of structuring a drawer of the above cited type such that a shift of the disk holder within the drawer in the extending state of the drawer is prevented. A shift of the disk holder already at the start of the opening process of the drawer is to be prevented.

The task is solved according to the invention through a latching and unlatching device essentially swivellable vertically on the receiving tray and actuatable from the bottom part, which is provided with snap elements for engaging the bottom part in the retracted state of the receiving tray and for engaging the disk holder when the receiving tray is extended.

For this purpose, the bottom part usefully comprises an opening in the margin region opposite to the extending direction of the receiving tray, which the corresponding snap element engages when the receiving tray is retracted.

In further development of the invention the latching and unlatching device comprises a catch lever movable on the underside of the receiving tray in a swivel axle supported transversely to its direction of extension. The catch lever accordingly is substantially vertically swivellable about this swivel axle.

According to an advantageous further development of the drawer according to the invention, the catch lever comprises on its top side the snap element assigned to the disk holder, which is directed upwardly and which during the extension of the receiving tray extends behind the margin region of the receiving tray opposite the direction of extension and of the disk holder.

The catch lever furthermore comprises on its underside the snap element assigned to the opening in the bottom part, which is directly oppositely to the

upwardly directed snap element and is developed such that it tapers conically. The snap element in the retracted state of the receiving tray is in the opening in the bottom part and when the receiving tray is being extended initially slides out of the opening and subsequently slides along on the bottom part. Due to the conically tapering form of the snap element an automatic vertical swivelling of the catch lever results when the drawer is being extended or retracted, with the snap element becoming engaging with or disengaged from the opening in the bottom part.

In a further formation of the drawer according to the invention the catch lever comprises on its top side a snap element which is adjacent to the snap element assigned to the disk holder, and disposed in the direction of extension of the receiving tray and directed further upward, which is assigned to the disk in the disk holder. Preferably the further snap element during the extension of the receiving tray engages a corresponding opening in the receiving tray and a corresponding cut-out in the margin of a depression, receiving a disk, of the disk holder. Thereby a securement of the disk in the disk holder against a shifting of the same during the extension of the receiving tray against the extension direction of the receiving tray, i. e. the disk cannot be pushed over the disk holder into the housing of the disk changer. It is understood that the further snap element projects over the disk holder so far that the receiving opening for the receiving tray in the housing of the disk changer is closed in this region.

The snap elements are usefully unitarily formed on the catch lever. This leads to a simple fabrication in terms of fabrication techniques.

To ensure swivelling which is always reliable and automatic during the extension and retraction of the drawer, the catch lever is preferably compression spring-loaded in the direction of the bottom part.

Through the invention a drawer for a disk changer is provided, in which a shifting of the disk and of the disk holder when the drawer is extended is already prevented at the start of the opening process.

The idea on which the invention is based will be explained further in the following description in conjunction with an embodiment example shown in the

drawing. Therein depict:

- Fig. 1 a top view onto the drawer according to the invention in the retracted state,
- Fig. 2 a top view onto the drawer in the extended state according to Figure 1,
- Fig. 3 a side view of the drawer in section in the retracted state according to Figure 1, and
- Fig. 4 a side view of the drawer in section in the extended state according to Figure 2.

A bottom part 3 associated with drawer 1 is fastened on a housing 2 of the disk changer. In Figures 3 and 4 this housing 2 is only shown partially. The bottom part 3 comprises two guide rods 4 extending parallel to each other. The drawer 1 has a receiving tray 5, which has two parallel guide rods 6, which have a smaller diameter than the guide rods 4 of the bottom part 3. By means of guide rods 6 the receiving tray 5 is movably mounted in the guide rods 4 of the bottom part 3, such that the receiving tray 5 shown in the extension direction by arrow 7, can be extended from and retracted into the bottom part 3 fastened on housing 2 of the disk changer.

To be able to actuate the drawer 1 on the front side of the receiving tray 5 a handle 8 with an appropriate grip depression 9, shown in Figures 1 and 2, is disposed. Beneath the bottom part 3 an electromechanically actuatable catch device 10 is disposed, with which the receiving tray 5 of the drawer 1 in the retracted state of the drawer, is arrested or the receiving tray 5 of the drawer 1 is unlatched, in order to be able to extend the drawer 1.

The receiving tray 5 comprises on its sides two opposing guide rails 11, into which a disk holder 12 can be slid. Through corresponding position securement elements 13 the disk holder 12 is detachably arrested in its receiving position. During the sliding-in or -out of the disk holder 12 from the guide rails 11 of the receiving tray 5, only a low resistance needs to be overcome, since the position

securement elements 13 are developed resiliently. Through these position securement elements 13 a certain light arresting of the disk holder 12 in every position of the drawer 1 takes place. In a depression 14 provided with a perforation of the disk holder 12 a disk 50, preferably a compact disk, is emplaced.

As evident in Figure 3, on the underside of the receiving tray 5 is disposed a latching and unlatching device 15. This latching and unlatching device 15 comprises a catch lever 16, which on its one end is supported swivellably, substantially in the vertical direction, on a swivel axles 17 disposed transversely to the extension direction 7 of the drawer 1. By means of a compression spring 18 the catch lever 16 is developed such that it is resilient against the bottom part 3.

In its front region the catch lever 16 has several snap elements. A first snap element 19 is developed such that it is directed upwardly on the front end of the catch lever 16 on its top side. On the underside of the catch lever 16 a second snap element 21 is provided in the front region, which is implemented such that it tapers conically. Furthermore, spaced apart from the first snap element 19 in the direction of the swivel axle 17 on the top side of the catch lever 16 a third upwardly directed snap element 20 is developed such that the snap elements 19 and 20 have virtually the form of tongs.

The first snap element 19 is provided for engaging the margin region 23 of disk holder 12 opposite to the direction of extension 7 of the drawer 1. The snap element 19 extends over a corresponding margin region 21 of the receiving tray 5. The second snap element 21, in contrast, is provided for engaging an opening 26 disposed in the bottom part 3. The third snap element 20 can be made to engage the margin region of disk 50 via a corresponding cutout 25 in the margin of a depression 14 receiving a disk 50 of disk holder 12. The disk holder 26 has two cutouts 25 opposing each other in the extension direction 7, since the disk holder 12 can also be placed into the receiving tray 5 when rotated by 180°.

In the retracted state of drawer 1 according to Figures 1 and 3 the drawer 1 is latched through the catch device 10 for the receiving tray 5. Thereby the conically

tapering snap element 21, disposed on the under side of the catch lever 16, extends into the opening 26 of the bottom part 3 of drawer 1 due to the compression spring 18. The snap elements 19 and 20 are therein disengaged from the margin region 22 and 23 of the receiving tray 5 and of the disk holder 12 as well as opening 24 of the receiving tray 5 and of cutout 25 in the disk holder 12. In this retracted state, the disk holder 12 can be removed in the direction of the interior volume of housing 2 of the disk changer, since it is not blocked by the catch lever 16.

When the catch device 10 releases the receiving tray 5 of the drawer 1, the receiving tray 5 moves in the extension direction 7 of drawer 1, as is shown in Figures 2 and 4. Due to the conical development of the snap element 21 disposed on the underside of the catch lever 16, it slides against the resistance of the compression spring 18 out of the opening 26 of the bottom part 3 and the catch lever 16 is simultaneously immediately at the start of the opening or extension process of the drawer 1 moved upwardly about its swivel axle 17. The snap elements 19 and 20 attack at the corresponding margin region 22 or a cutout of the receiving tray 5 and of the margin region 23 of the disk holder 12, while the snap element 19 extends into the opening 24 of the receiving tray 5 and into the cutout 25 of the disk holder 12. Consequently, this ensures already at the start of the extension process of the drawer 1 that the disk holder 12 in the receiving tray 5 of drawer 1 cannot be shifted in any direction and simultaneously a shifting of the disk against the extension direction is prevented.

Since the snap element 21 slides along on the inside of bottom part 3 while the extension process is being executed and terminated, the catch lever 16 is swivelled upwardly and the extension of the snap elements 19 and 20 into the receiving tray 5 and the disk holder 12 is maintained. Only when the drawer 1 is closed, do the snap elements 19 and 20 disengage from the receiving tray 5 and the disk holder 12, and specifically when the snap element 21 on the underside of the catch lever 16 slides into the opening 26 of the bottom part 3.

## Patent Claims

1. Drawer for loading and unloading a disk changer with a disk (50), in particular for compact disks, comprising
  - a bottom part (3) fastened in a housing (2) of the disk changer,
  - a receiving tray (5) which can be retracted and extended on the bottom part (3), and
  - an exchangeable disk holder (12) mounted in the receiving tray (5) for receiving the disk (50),

**characterized by**

a latching and unlatching device (15) actuatable from the bottom part (3) and substantially vertically swivellable on the receiving tray (5), which is provided with snap elements (21, 29) for engaging the bottom part (3) in the retracted state of the receiving tray (5) and for engaging the disk holder (12) during the extension of the receiving tray (5).
2. Drawer as claimed in claim 1, characterized in that the bottom part (3) has an opening (26) in the margin region opposite to the extension direction (7) of the receiving tray (5), into which extends the corresponding snap element (21) when the receiving tray (5) is retracted.
3. Drawer as claimed in claims 1 and 2, characterized in that the latching and unlatching device (15) comprises a catch lever (16) movable on the underside of the receiving tray (5) in a swivel axle (17) supported transversely to its extension direction (7).

4. Drawer as claimed in claim 3, characterized in that the catch lever (16) has on its upper side the snap element (19) assigned to the disk holder (12), which is directed upwardly and during the extension of the receiving tray (5) extends behind the margin regions (22, 23) opposite the extension direction (7), of the receiving tray (5) and of the disk holder (12).
5. Drawer as claimed in claims 3 and 4, characterized in that the catch lever (16) on its underside has the snap element (21) assigned to the opening in the bottom part, which is directed oppositely to the upwardly directed snap element (19) and is developed such that it tapers conically, and the snap element (21) in the retracted state of the receiving tray (5) engages the opening (26) in the bottom part (3) and during the extension of the receiving tray (5) initially slides out of the opening (26) and subsequently slides along on the bottom part (3).
6. Drawer as claimed in one of claims 3 to 5, characterized in that the catch lever (16) on its upper side has a further upwardly directed snap element (20) adjacent to the snap element (19) assigned to the disk holder (12), disposed in the extension direction (7) of the receiving tray (5), which [further snap element] is assigned to disk (50) in disk holder (12).
7. Drawer as claimed in claim 6, characterized in that the further snap element (20) during the extension of the receiving tray (5) comes to engage a corresponding opening (24) in the receiving tray (5) and a corresponding cutout (25) in the margin of a depression (14), receiving a disk (50), of the disk holder (12).
8. Drawer as claimed in one of claims 3 to 7, characterized in that the snap elements (19, 20, 21) are formed unitarily on the catch lever (16).

9. Drawer as claimed in at least one of claims 1 to 9, *[sic]* characterized in that the catch lever (16) is loaded with a compression spring (18) in the direction of the bottom part (3).

---

4 pages of drawing enclosed

---